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Paper Abstract

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Paper Title: A Tool For Building Temporal Dependency Networks

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Description:

Procedure acquisition and representation are time intensive activities and considered major bottlenecks in most software engineering activities. As the need for more complex and efficient systems arise, so does the need for intelligent tools to automate this process while incorporating techniques and constraints for minimizing human error. This paper describes a tool that generates Temporal Dependency Networks (TDNs). A TDN is a directed graph which incorporates temporal and behavioral knowledge and also provides optional and conditional paths through the network. The directed graph represents a complete end-to-end sequence for an operational procedure. It is a basis for the automation in the Link Monitor and Control Operator Assistant (LMCOA) technology, a semi-automated monitor and control system built to support station operations for NASA's Deep Space Network (DSN) and is also being used to represent simultaneous real-time activities in the Multi-link technology being developed for the DSN.

The tool described in this paper is a result of evaluating several procedure acquisition tools. This study emphasized the need for a tool that enables the user to graphically build TDNs, thus, providing the capability to dynamically create, edit, and maintain TDN knowledge and all graphical representations associated with it within a compact knowledge base. The tool is designed to be used by domain experts and novices alike, is domain-independent, will allow the user to develop a library of TDNs, and will provide the capability to represent data in a centralized knowledge base. These and more issues are currently being explored and addressed in a prototype currently being developed to support the LMCOA and Multi-link technology at the DSN. The tool has a variety of commercial applications ranging from complex systems requiring real-time monitor and control to simple interactive and diagnostic environment applications requiring procedure representation.